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ABSTRACT

The effect of stimulus novelty, an attentional variable, on learning set acquisition was investigated. Learning set (LS) acquisition refers to an improvement in performance across a series of problems which have a common basis of solution. The design of this study involved two groups, one in which the positive stimulus on Trial 2 involved the introduction of a novel dimension (Novelty-Positive), and one in which the negative stimulus involved novelty (Novelty-Negative). The novel dimension introduced was color, and was preceded by both rewarded and nonrewarded first trials. Twenty-four 3-year-old children were randomly assigned to one of the two experimental treatments. The results supported the novelty hypothesis in that performance was significantly better in group Novelty-Positive than in group Novelty-Negative. No significant reward differential was found in this experiment as has been found in other studies (e.g., Moss & Harlow, 1947). The result of the present experiment replicates a similar finding reported by Callaghan and Cameron (1978). (Author/SS)

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Introduction of a Novel Dimension in Young Children's Learning Sets

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Abstract

The term learning set (LS) acquisition refers to an improvement in performance across a series of problems which have a common basis of solution. The purpose of the present experiment was to examine an attentional variable, stimulus novelty, as it affects LS acquisition. The design involved two groups, one in which the positive stimulus on Trial 2 involved the introduction of a novel dimension (Novelty-Positive), and one in which the negative stimulus involved novelty (Novelty-Negative). In this experiment, the novel dimension introduced was color, and was preceded by both rewarded and nonrewarded first trials. Twenty-four three-year-old children were randomly assigned to one of the two experimental treatments. The results supported the novelty hypothesis in that performance was significantly better in group Novelty-Positive than in group Novelty-Negative. No significant reward differential was found in this experiment as has been found in other studies (e.g., Moss & Harlow, 1947). The result of the present experiment replicates a similar finding reported by Callaghan and Cameron (1978). Their study involved the introduction of an entirely novel stimulus on Trial 2. The findings of the present experiment more clearly establish the effectiveness of novelty as a director of attention in LS procedures, and thus strengthen the validity of the novelty explanation of LS acquisition.

Novelty has frequently been assumed to direct the responding of young human subjects. Zeaman (1976), extrapolating from an extensive series of studies, reports that the novelty-familiarity dimension has strong attention or cue value. Solution of a discriminative learning problem seems greatly to be facilitated by the introduction of novelty. Zeaman found evidence that a learned tendency to use variability or novelty as a cue was the source of a learning set. Further evidence suggests that familiarity and novelty aspects of stimuli can improve performance by making stimuli more distinctive.

The learning set paradigm has been used to demonstrate improvement in performance across a series of problems which have a common basis of solution. In a discrimination learning set problem, the child is presented with a stimulus pair and must learn to choose one stimulus and to avoid the other. Each problem can be solved using this win-stay, lose-shift rule. Therefore, information gained from the solution of individual problems is transferred to the solution of all subsequent problems.

Several studies conducted in our laboratory have examined attentional variables in learning set acquisition. Cameron, in 1979, investigated the interaction between amount of exposure to individual problems and age. Younger children acquire a learning set in a fashion comparable to that of older children if given increased within-problems exposure. Cameron reasoned that this finding was due to the provision of an opportunity for the younger subjects to attend to the relevant problem-solution dimension. Subsequent studies which we have conducted have revealed the disruptive effects of the introduction of increased numbers of varying irrelevant dimensions (Cameron & Gray, 1977) and other stimulus effects on learning set performance (Cameron & Callaghan, 1979) have also been examined

Callaghan and Cameron (1978) have shown that learning set performance is

differentially affected by the introduction of an entirely new stimulus on the second trial of each problem of a learning set series. Children perform significantly better when the novel stimulus replaces the previously positive stimulus (group Novelty-Positive) than they do when the novel stimulus replaces the previously negative stimulus (group Novelty-Negative). The purpose of the present study is to extend the Callaghan and Cameron finding by introducing a novel dimension, color, on the second trial of each problem. A two-choice, three-trial discrimination learning set sequence was employed. The introduction of a novel dimension on Trial 2 was expected to facilitate the performance of children in group Novelty-Positive and disrupt the performance of the Novelty-Negative children.

METHOD

Subjects

The subjects were 24 normal three-year-old children (mean age = 3-4) who attended local day-care centers serving predominantly middle-class families. Twelve children were assigned at random to each of the two experimental treatments: Novelty-Positive and Novelty-Negative. All children were experimentally naive, and unselected with regard to socioeconomic background or sex.

We tested three-year-old children because it is at this age that the preference for novel stimuli appears to be at its peak using the procedures proposed (Cameron & Callaghan, in press). This novelty preference has been found to disappear by the age of five (Cross & Vaughter, 1966; Zeaman, 1976).

Procedure and Materials

The stimuli were black and white pictures of common objects (e.g., a truck, flowers, a teddy bear) drawn on white (7.5 x 12.5 cm) index cards and inserted in clear plastic envelopes. Copies of these same stimuli were colored for the introduction of the novel dimension of color on Trial 2 of each

problem. Each child in one treatment received a different sequence of stimuli and that sequence was used for a matched subject in the other experimental treatment. These stimuli were selected at random from a pool of 144 pictures. The correct stimulus and its left-right position were determined at random (Fellows, 1967).

Stimulus pairs were presented in front of a grey vertical screen (50 x 30 cm). The purpose of the screen was to shield the scoresheets and the stimulus pool from the child.

The children were tested individually on two consecutive days. They were told that they were going to play a game with some pictures. Each child was instructed that if she chose the correct picture the experimenter would 'good' and if she chose the wrong picture the experimenter would say 'no.'

In each of the two 10-minute sessions the children received 24 two-choice stimultaneous discrimination problems with three trials per problem. A noncorrection procedure was maintained.

RESULTS

We calculated an analysis of variance on the total number of correct Trial 2 responses. The dependent variable of interest is Trial 2 responses for the following reasons: performance during Trial 1 is only at the level of chance, and secondly, by Trial 3 the stimuli are no longer novel and therefore novelty would not be expected to influence the child's responding. There is evidence to suggest that the effect of novelty is attenuated following Trial 2 (House & Zeaman, 1958).

We had two between-subjects treatments: the Novelty-Positive and Novelty-Negative conditions, with 12 subjects in each condition, and a within-subjects variable: first-trial outcome - a child could either be rewarded or non-rewarded on Trial 1. Novelty-Positive children were presented with a

novel stimulus on Trial 2 which replaced the previously positive stimulus, while in the Novelty-Negative condition, a novel stimulus on Trial 2 replaced the previously negative stimulus. This arrangement is depicted in Figure 1.

The only significant effect was the main effect of experimental treatment. Novelty-Positive subjects, attaining 74.38% correct, performed significantly better than Novelty-Negative children who achieved only 57.30% correct ($F(1, 22) = 7.04$, $p < .05$). We did not find an expected first-trial reward differential, nor was there an interaction between treatments and first-trial outcome. Absence of the commonly obtained first trial reward differential (e.g., Grabbe & Campione, 1969) may be due to the presentation of two stimuli on Trial 1 of each problem, the type of novelty manipulations employed here or to the transitory nature of the differential effect.

DISCUSSION

Introduction of a new dimension within problems of a learning set sequence has been found to affect the performance of young children. Color added on the second trial resulted in a performance gap between treatments. We have replicated this finding using a within-subjects design which confirms the strength of the effect. Our results indeed extend the findings of Callaghan and Cameron (1978) who introduced entirely new stimuli on Trial 2. The effectiveness of novelty as a director of attention in learning set procedures has been more clearly established, thus strengthening the validity of the novelty explanation. Our findings also support the contention of Zeaman (1976) concerning the ubiquity of novelty in young children's problem-solving. The present design not only eliminated the commonly obtained first-trial reward differential, but succeeded in removing the confound embedded in many of the studies investigating that effect, putting the novelty hypothesis to experimental test.

In sum, the manipulation of attentional variables has been found to affect the acquisition of a learning set in preschool children as has previously been claimed (Cameron, 1979). The next step in our investigation is to examine the effects of different types of novelty manipulations. We are currently examining the effect of presenting two colored stimuli on Trial 1 and then removing color on Trial 2 by presenting one previously presented colored stimulus paired with a black and white stimulus. It is expected that the subjects will still use novelty as a cue, resulting in superior performance when the novel noncolored stimulus replaced the previously positive stimulus on Trial 2, and poorer performance when the novel non colored stimulus replaced the previously negative stimulus.

REFERENCES

Callaghan, T., & Cameron, C. A. The effects of novelty on learning set acquisition in young children. Paper presented at the Annual Meeting of the Canadian Psychological Association, Ottawa, 1978.

Cameron, C. A. Trials per problem and age as factors on learning set formation of children. Journal of Experimental Child Psychology, 1979, 27, 410-422.

Cameron, C. A., & Callaghan, T. Stimulus effects on young children's learning sets. Paper presented at the Annual Meeting of the Canadian Psychological Association, Quebec City, 1979.

Cameron, C. A., & Callaghan, T. Presentation method and first trial outcome effects on preschool children's learning sets. Canadian Journal of Behavioral Science, in press.

Cameron, C. A., & Gray, V. A. Effect of varying irrelevant dimensions on learning set performance of children. Paper presented at the Annual Conference of the British Psychological Society, Exeter, 1977.

Cross, H. A., & Vaughter, R. M. The Moss-Harlow effect in preschool children as a function of age. Journal of Experimental Child Psychology, 1966, 4, 280-284.

Fellows, B. J. Chance stimulus sequences for discrimination tasks. Psychological Bulletin, 1967, 67, 87-92.

Grabbe, W., & Campione, J. C. A novelty interpretation of the Moss-Harlow effect in preschool children. Child Development, 1969, 40, 1077-1084.

House, B. J., & Zeaman, D. Reward and nonreward in the discrimination learning of imbeciles. Journal of Comparative and Physiological Psychology, 1958, 51, 614-618.

Zeaman, D. The ubiquity of novelty-familiarity (habituation?) effects. In T. J. Tighe & R. N. Leaton (Eds.), Habituation: Perspectives from child development, animal behavior, neurophysiology. Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1976.

TRIAL	Novelty-Positive	Novelty-Negative
1	B/W B/W	B/W B/W
2	C B/W	B/W C
3	C B/W	B/W C

Figure 1. Procedures for the Novelty-Positive and Novelty-Negative conditions. The symbols B/W and C refer to black and white and colored stimuli, respectively.